

REMARKS

Pursuant to the present amendment, claim 1 has been amended. Claims 1-18 are pending in the present application. Claims 77-84 have been withdrawn from consideration. No new matter has been introduced by way of the present amendment. Reconsideration of the present application is respectfully requested.

In the Office Action, claim 17 was indicated to be allowable if rewritten in independent form. Claims 1-16 and 18 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Lin (U.S. Patent No. 6,602,729). Applicants respectfully traverse the Examiner's rejection.

It is believed that the Examiner's rejection is based upon a misunderstanding of the claimed invention. In general, the present invention is directed to a method that includes, among other things, applying a plurality of constant voltage pulses to the device recited in claim 1. That is, for example, a plurality of pulses – each of which have the same constant voltage – are applied to the device. It is clear from the Office Action that the Examiner was focusing on a single voltage pulse to determine if it was constant within the period that such a single voltage pulse was applied. Office Action, p. 6. This is apparent from the discussion regarding sinusoidal and square wave pulses.

It is believed that the existing claim language “constant voltage pulses” was sufficiently clear on this point. To avoid any confusion, claim 1 has been amended to recite “wherein each of said voltage pulses are at the same voltage level” to further clarify this point. Support for the amendment can be found throughout the specification; see, e.g., p. 11, l. 13 – p. 13, l. 2; p. 13, l. 12 – p. 14, l. 2; Figures 3-4. It is believed that the present amendment does not add any limitations to the claim that were not already present.

In addition to requiring the plurality of constant voltage pulses (each of which are at the same voltage level), claim 1 recites that the step of determining a time-to-breakdown for the dielectric layer based upon a count of the number of pulses applied to the device to break down the dielectric layer. It is respectfully submitted that Lin does not disclose nor suggest the method set forth in independent claim 1.

Lin is understood to be directed to a method of testing a dielectric material. Abstract. To that end, Lin proposes use of a testing methodology wherein a reference current (I_{ref}) is initially established. This reference current is chosen to be a value below the breakdown current (I_{bd}) of the dielectric layer but greater than the expected base current so as to avoid wasting time on unnecessary early measurements of the base current. According to Lin, Figure 2 disclosed therein is a flowchart of a prior art method of testing dielectric layers. Lin specifically notes that the stress voltage (V_s) may be incremented at node 4 and the loop disclosed therein may continue. Lin goes on to set forth a flowchart (Figure 5) for the invention described therein. Lin specifically notes that if the measured stress current (I_s) is the same or lower than the reference current (I_{ref}), then the stress voltage is incremented by an amount and the procedure continues through the testing loop. Col. 3, ll. 38-52. As understood by the undersigned, the methodology disclosed in Lin involves incrementally increasing the voltage applied to the dielectric layer until breakdown occurs. Col. 2, ll. 53-56; Col. 3, ll. 14-17; Col. 3, ll. 49-52. Moreover, the methodologies disclosed in Lin for determining the breakdown of the dielectric layer involve measuring and detecting the breakdown current (I_{bd}). Figure 3; Col. 3, ll. 18-25.

As thus understood, it is respectfully submitted that Lin does not anticipate nor render obvious claim 1 for many reasons. Lin does not disclose applying a plurality of constant voltage pulses, nor is time-to-breakdown determined based upon a count of the number of pulses applied

to break down the dielectric layer. Lin specifically discloses a methodology whereby the applied voltage is incremented or increased at each successive step until breakdown occurs. At no point is the concept of applying constant voltage pulses and determining breakdown based upon the a count of the number of those applied pulses even remotely disclosed or suggested.

It is respectfully submitted that any attempt to assert that the invention defined by independent claim 1 is obvious in view of Lin necessarily involves an improper use of hindsight using Applicants' disclosure as a roadmap. A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35. Moreover, it is unclear how the methodology disclosed in Lin could even employ a plurality of constant voltage pulses to achieve the objectives of the invention disclosed therein. Lin relies upon the incrementally increased voltage to achieve a sufficiently high current to cause breakdown of the dielectric. It is believed that the methodology disclosed in Lin is incompatible with that currently set forth in independent claim 1. Thus, it is believed that independent claim 1, and all claims depending therefrom, are in condition for immediate allowance.

Dependent claims 2 and 3 are likewise to be independently allowable over the art of record. According to these claims, the invention set forth in claim 1 further comprises measuring a current through the dielectric layer after one or more or each (depending upon the claim) of the plurality of constant voltage pulses has been applied. Lin simply does not disclose or suggest a methodology of measuring a current after the application of one or more constant voltage pulses.

Accordingly, dependent claims 2 and 3 are likewise believed to be allowable independent of their dependence upon claim 1.

It is further submitted that dependent claim 14 is likewise allowable for reasons other than its dependency upon independent claim 1. In rejecting claim 14, the Examiner cited to Col. 3, ll. 8-17, of Lin. Office Action, p. 5. Applicants respectfully disagree. Claim 14 involves the step of determining at least one parameter of a process operation to be performed to form a dielectric layer on at least one subsequently processed substrate based upon the determined time-to-breakdown. The passages of Lin identified by the Examiner simply do not address or even mention this aspect of the currently claimed invention. The identified passages of Lin merely describe a prior art methodology wherein stress currents (I_s) and base currents (I_b) are measured and wherein the stress voltage may be incremented if breakdown has not yet occurred. There is simply no suggestion in Lin, or any other art of record, for determining at least one parameter of a process operation to be performed to form a dielectric layer on at least one subsequently processed substrate based upon the determined time-to-breakdown. Accordingly, it is respectfully submitted that dependent claim 14 is independently allowable over the art of record.

In view of the foregoing, it is respectfully submitted that claims 1-18 are in condition for allowance.

Given the close relationship between claims 1-18 and 77-84, Applicants again assert that claims 77-84 should be considered in the present action. In anticipation of the Examiner's reconsideration of claims 77-84 in this case, independent claims 77 and 81 have been amended to include the language added in claim 1 by this amendment.

In view of the foregoing, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the undersigned attorney

at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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